

(FILE 'HOME' ENTERED AT 16:36:46 ON 25 JAN 2007)

FILE 'REGISTRY' ENTERED AT 16:37:40 ON 25 JAN 2007

L1 1 S 3-HYDROXYPROPANAL/CN  
L2 1 S 1,3-PROPANEDIOL/CN  
L3 1 S SODIUM HYDROXIDE/CN

FILE 'CAPLUS, CAOLD' ENTERED AT 16:39:45 ON 25 JAN 2007

L4 137 S L1 AND L2  
L5 4 S L4 AND L3  
L6 1 S L5 AND VISCO?  
L7 11 S L4 AND HYDROXIDE  
L8 7 S L7 NOT L5  
L9 7 S L8 AND HYDROGEN?  
L10 0 S L9 AND VISCO?

10/676882

Search by E. Price  
1/25/2007

10/676082  
 Search by Elvis Price  
 1/25/2007

L5 ANSWER 1 OF 4 CAPLUS COPYRIGHT 2007 ACS on STN  
 AN 2006:491425 CAPLUS  
 DN 144:489080  
 TI Catalyst for the production of 1,3-propanediol by catalytic hydrogenation  
 of 3-hydroxypropanal  
 IN Eng, John Harvey  
 PA USA  
 SO U.S. Pat. Appl. Publ., 13 pp.  
 CODEN: USXXCO  
 DT Patent  
 LA English  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2006111595	A1	20060525	US 2004-996756	20041124
PRAI	US 2004-996756		20041124		
AB	A process for preparing a catalyst, comprising sequentially: (a) saturating a				
TiO2	support with aqueous ruthenium solution; (b) treating the ruthenium saturated				
TiO2	support with an aqueous base solution; and (c) curing the ruthenium saturated				
TiO2	to				
	impregnate the TiO2 with ruthenium. Preferably, subsequent to step (c)				
	the process comprises sequentially (d) washing the ruthenium impregnated				
	TiO2 with water, (e) drying the washed ruthenium impregnated TiO2, and (f)				
	heat treating the ruthenium impregnated TiO2 under reducing conditions at				
	temps. of 150-800° C. A catalyst prepared by the process. A process				
	for the production of 1,3-propanediol, comprising: (a) providing				
	3-hydroxypropanal and the catalyst, and (b) hydrogenating the				
	3-hydroxypropanal in the presence of the catalyst.				

L5 ANSWER 2 OF 4 CAPLUS COPYRIGHT 2007 ACS on STN  
 AN 2004:308390 CAPLUS  
 DN 140:323182  
 TI Reduction of the viscosity of reactive heavy byproducts during the  
 production of 1,3-propanediol using other than sodium hydroxide  
 IN James, Talmadge Gail; Komplin, Glenn Charles; Nielsen, Edward Lewis;  
 Knifton, John Frederick; Powell, Joseph Broun; Weider, Paul Richard  
 PA Shell Oil Company, USA  
 SO PCT Int. Appl., 15 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004031108	A1	20040415	WO 2003-US31216	20031002
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,				
	CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,				
	GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,				
	LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ,				
	OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,				
	TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,				
	KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES,				
	FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR,				
	BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	US 2005043570	A1	20050224	US 2003-676682	20031001
	CA 2500615	A1	20040415	CA 2003-2500615	20031002
	AU 2003279749	A1	20040423	AU 2003-279749	20031002
	EP 1546075	A1	20050629	EP 2003-773090	20031002
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,				
	IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				

BR 2003015025	A	20050816	BR 2003-15025	20031002
CN 1703388	A	20051130	CN 2003-80100866	20031002
JP 2006502202	T	20060119	JP 2004-542042	20031002
PRAI US 2002-415676P	P	20021003		
WO 2003-US31216	W	20031002		

AB An improvement upon the process for the production of 1,3-propanediol is presented where an aqueous solution of 3-hydroxypropanal is formed, the catalyst, if any, used in the formation is removed from the solution, sodium hydroxide is added to the solution to neutralize any acid therein such that the pH is  $\geq 5$ , the neutralized aqueous solution is subjected to hydrogenation to produce a crude 1,3-propanediol mixture which is distilled to produce 1,3-propanediol, water, and reactive heavy components. The improvement comprises replacing the sodium hydroxide with a hydroxide selected from the group consisting of ammonium hydroxide, alkali metal hydroxides other than sodium hydroxide, and alkaline earth metal hydroxides to reduce the viscosity of the reactive heavy components.

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 3 OF 4 CAPLUS COPYRIGHT 2007 ACS on STN  
AN 1999:177140 CAPLUS  
DN 130:330016

TI In-situ infrared reflectance spectroscopic study of propanediol electrooxidation at platinum and gold Part 1: 1,3-propanediol  
AU Chbihi, M. El M.; Takky, D.; Hahn, F.; Huser, H.; Leger, J. M.; Lamy, C.  
CS Departement de Chimie, Faculte des Sciences Ben M'sik, Universite Hassan II, Casablanca, Morocco

SO Journal of Electroanalytical Chemistry (1999), 463(1), 63-71  
CODEN: JECHES; ISSN: 0368-1874

PB Elsevier Science S.A.

DT Journal

LA English

AB The electrooxidn. of 1,3-propanediol was studied in acid and alkaline media on platinum and gold electrodes. It is shown by voltammetric techniques that the oxidation of 1,3-propanediol is partially a diffusion controlled. Electrolysis results and in situ FTIR reflectance spectroscopy allowed the authors to identify the adsorbed species and the reaction products. A possible reaction mechanism is discussed.

RE.CNT 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2007 ACS on STN  
AN 1998:459783 CAPLUS  
DN 129:122962

TI Cobalt-catalyzed process for preparing 1,3-propanediol  
IN Powell, Joseph Broun; Slaugh, Lynn Henry; Forschner, Thomas Clayton; Lin, Jiang-jen; Thomason, Terry Blane; Weider, Paul Richard; Semple, Thomas Carl; Arhancet, Juan Pedro; Fong, Howard Lam-ho; Mullin, Stephen Blake; Allen, Kevin Dale; Eubanks, David Cleve; Johnson, David William

PA Shell Oil Co., USA

SO U.S., 8 pp., Cont.-in-part of U. S. Ser. No. 316,676.  
CODEN: USXXAM

DT Patent

LA English

FAN.CNT 9

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	US 5777182	A	19980707	US 1996-703295	19960826
	US 5563302	A	19961008	US 1994-316680	19940930
	US 5576471	A	19961119	US 1994-316669	19940930
	US 5585528	A	19961217	US 1994-316660	19940930
	IN 191806	A1	20040103	IN 1995-DE1731	19950920
	ZA 9508161	A	19960620	ZA 1995-8161	19950928

	US 5981808	A	19991109	US 1997-892831	19970715
PRAI	US 1994-316660	A2	19940930		
	US 1994-316669	A2	19940930		
	US 1994-316676	A2	19940930		
	US 1994-316680	A2	19940930		
	US 1996-720270	B1	19960926		

AB 1,3-Propanediol is prepared in a process which involves hydroformylating ethylene oxide: (a) in an essentially non-water-miscible solvent in the presence of a non-ligated cobalt catalyst and a catalyst promoter at a temperature within the range of about 50° to about 100° C and a pressure within the range of about 500 to about 5000 psig, to produce an intermediate product mixture comprising less than about 15 wt % 3-hydroxypropanal; (b) adding an aqueous liquid and extracting at a temperature less than about 100° C the 3-hydroxypropanal to provide an aqueous phase comprising 3-hydroxypropanal in greater concentration than the concentration of 3-hydroxypropanal in said intermediate product mixture, and an organic phase comprising the cobalt catalyst; (c) separating the aqueous phase from the organic phase; (d) hydrogenating the 3-hydroxypropanal to provide a hydrogenation product mixture comprising 1,3-propanediol; and (e) recovering 1,3-propanediol from said hydrogenation product mixture. The process enables the production of 1,3-propanediol in high yields and selectivity without the use of a phosphine ligand-modified cobalt catalyst. Thus, the hydroformylation of ethylene oxide in the presence of dicobaltoctacarbonyl catalyst and NaOAc promoter proceeded at a rate 3-times higher than hydroformylation in the absence of NaOAc.

RE.CNT 28      THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2007 ACS on STN  
 AN 2006:690086 CAPLUS  
 DN 145:210617  
 TI Process for preparation of 3-hydroxypropanal and 1,3-propanediol  
 IN Lu, Shunfeng; Wang, Shiliang; Peng, Bin; Qin, Yanhuang; Zhou, Zhiquan; Wu, Xiuxiang  
 PA Sinopec Corp., Peop. Rep. China  
 SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 10 pp.  
 CODEN: CNXXEV  
 DT Patent  
 LA Chinese  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1690033	A	20051102	CN 2004-10037658	20040429
PRAI	CN 2004-10037658		20040429		

AB This invention provides a process for preparing 3-hydroxypropanal and 1,3-propanediol comprising reacting epoxyethane with synthetic gas followed by hydrogenation. For example, epoxyethane was reacted with synthetic gas in the presence of Co<sub>2</sub>(CO)<sub>8</sub> to give 3-hydroxypropanal. The 3-hydroxypropanal was hydrogenated in water in the presence of Raney Ni to give 1,3-propanediol in high yield.

L9 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2007 ACS on STN  
 AN 2002:695924 CAPLUS  
 DN 137:218714  
 TI Process for producing 1,3-propanediol through acrolein hydration and hydroxypropanal hydrogenation and active hydration catalysts for use in the process  
 IN Tsunoda, Takashi; Nomura, Kouji  
 PA Asahi Kasei Kabushiki Kaisha, Japan  
 SO PCT Int. Appl., 35 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA Japanese  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002070447	A1	20020912	WO 2002-JP1921	20020301
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	CN 1494523	A	20040505	CN 2002-805858	20020301
	TW 224591	B	20041201	TW 2002-91103840	20020301
	US 2004097764	A1	20040520	US 2003-469513	20030902
	US 6911566	B2	20050628		
PRAI	JP 2001-57877	A	20010302		
	JP 2001-75408	A	20010316		
	JP 2001-389260	A	20011221		
	WO 2002-JP1921	W	20020301		

AB The process comprises hydrating acrolein in a liquid phase in the presence of a hydration catalyst to form 3-hydroxypropanal, subsequently removing the acrolein when it remains unreacted, and then catalytically hydrogenating the 3-hydroxypropanal in a liquid or vapor phase using a hydrogenation catalyst, where the hydration catalyst is a catalyst which comprises (a) metalloaluminophosphate type mol. sieves, (b) FER zeolites or/and (c) oxides or composite oxides of Groups 4, 13 or/and

14 elements (provided that crystalline aluminosilicate zeolite is excluded) and which, when dispersed into a 5-fold amount by weight of water, gives a slurry having a pH at 20° of 6 or lower. Thus, mixing water 146.7 with a 85% H3PO4 aqueous solution 95.9, Al(OPr-i)3 169.6, silica powder 2.6 and 20% tetraethylammonium hydroxide aqueous solution 305.2 g at 150° for 133 h, filtering, washing, drying and baking at 500° for 2 h gave a powder having (P2O5 + Al2O3)/SiO2 molar ratio 10:1. Mixing the crystalline powder with 1N NH4NO3 aqueous solution (10% slurry) at room temperature for 3 h, filtering, washing, drying and baking at 530° for 3 h gave a H-type SAPO-34 catalyst having solution pH (10 g in 50 g water) at 20° of 4.3. Hydration of acrolein using the catalyst had good conversion (49%) and selectivity (96 mol%).

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:157211 CAPLUS

DN 135:19301

TI Modeling the reaction behavior of glycerol in sub- and super-critical water

AU Anon.

CS Germany

SO Wissenschaftliche Berichte - Forschungszentrum Karlsruhe (2000), FZKA 6553, 1-187  
CODEN: WBFKF5; ISSN: 0947-8620

DT Report

LA German

AB The intention of this thesis was to develop a reaction model to describe the reaction dynamics of glycerol in sub- and supercrit. water (T > 374°, p > 221 bar). The model aimed at improving the understanding of the competition of ionic and radical reactions in this solvent. The model is based on the results of 66 expts. performed in a tube reactor. The reactions were carried out at variable temperature (622-748 K), pressure (250, 350 and 450 bar), reaction time u(32-60 s.), and initial glycerol concentration (1-3 volume%). The product samples consisted of a liquid and a gaseous

phase. A special methodol. for the anal. of each phase had to be worked out. The liquid products were analyzed by headspace-GC-FID and UV-VIS spectroscopy, the gaseous products by GC-WLD-FID. In subcrit. water (622.4 K, 450 bar), mainly the formation of acetaldehyde, acrolein, and formaldehyde could be observed, whereas the formation of gaseous products was negligible. Due to the occurrence of a small number of products only, a high dielec. constant ( $\epsilon = 17$ ) as well as the high values for the ionic product of water ( $K_w = 10^{-11.2} \text{ mol}^2/\text{I}^2$ ), it was strongly justified to assume a certain ionic reaction mechanism. In supercrit. water, on the other hand, the formation of oxidation and reduction products as a result of reactions with OH and H radicals was observed. The following main products were detected as part of the liquid phase: acetaldehyde, acrolein, H2CO, MeOH, allyl alc., propionaldehyde, EtOH, and finally Me2CO. Within the gaseous phase large amts. of CO, CO2, and H2 could be measured. The model calcns. of the reactant and product dynamics were executed by the Chemkin II code on the basis of defined ionic and radical reaction steps. A plug flow behavior under isothermal and isobaric conditions was assumed for the calcns. Due to the lack of well-known reactions in high-temperature water,

both the chemical and the kinetic parameters, especially for the ionic reactions, were

often highly speculative. Radical reaction steps were based on the classical steps of pyrolysis, whereas the ionic reactions mainly considered bimol. and monomol. elimination as well as aldol condensation and acetalization. The concentration of H+ and OH- was controlled by the self-dissociation of water. The dynamics of reactions and products was optimized stepwise for a pressure of 450 bar. By the results of flow and

sensitivity calcns., a specific variation of the approximated kinetic parameters became possible. These calcns. gave an addnl. hint as to the missing key reactions. In consideration of concerted reaction steps the number of key reactions was substantially reduced and the optimization process simplified. O-containing substances were stabilized by a H-bonding correction. At the end of the optimization process the reaction model consisted of 95 substances, 340 radical and 43 ionic reactions. But only 36 radical and 12 ionic reactions were detected as sensitive key reactions. Exptl. and calculated data differed at lower pressures (250 and 350 bar) as a result of the cage effect. Accordingly, reactions were accelerated with decreasing pressure and a transition from the diffusion controlled reaction to the kinetically controlled reaction was possible. The order n of the global reaction velocity was determined by  $n = 0.95-1.25$ . A definite dependence neither on pressure nor on temperature was found. The diagram of Arrhenius showed an overlay of the 2 mechanisms. Whereas the free radical mechanism depended mainly on the temperature, the ionic mechanism was determined by the ionic product of water. An activation energy of 150.3 kJ/mol and a pre-exponential factor of 1018 s<sup>-1</sup> could be evaluated. Furthermore, a decline in temperature from 664 K (450 bar) to 622 K (450 bar) was followed by an obvious increase of the global reaction velocity. The pressure rise accelerated the reaction velocity at a temperature of 665-668 K. Between 250-350 bar an activation volume of -167 cm<sup>3</sup>/mol was estimated. Due to the mechanism overlay, the diagram of Kirkwood ( $\epsilon = 2.7-12.3$ ) also did not show any linear dependency. The global reaction velocity increased with the dielec. constant of the solvent because the transition states had a higher polarity than the reactants. The strongest increase could be observed in the area of the ionic mechanism. Although the model calcns. were conducted on the basis of many assumptions, the results led to a good description of the chemical expts. and, therefore, contributed essentially to the understanding of such a complex reaction system in high-pressure water.

RE.CNT 91 THERE ARE 91 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2007 ACS on STN  
AN 1997:719688 CAPLUS  
DN 127:347899  
TI Preparation of 1,3-propanediol from ethylene oxide  
IN Weider, Paul Richard; Powell, Joseph Broun; Lam, Khiat Thanh  
PA Shell Oil Co., USA  
SO U.S., 8 pp., Cont.-in-part of U.S. Ser. No. 316,676, abandoned.  
CODEN: USXXAM  
DT Patent  
LA English  
FAN.CNT 9

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5684214	A	19971104	US 1995-550589	19951031
	CA 2235065	A1	19970509	CA 1996-2235065	19961028
	CA 2235065	C	20060103		
	WO 9716250	A1	19970509	WO 1996-EP4700	19961028
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN				
	RW: KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI				
	AU 9674954	A	19970522	AU 1996-74954	19961028
	AU 700053	B2	19981217		
	EP 862495	A1	19980909	EP 1996-937285	19961028
	EP 862495	B1	19990728		
	R: BE, CH, DE, ES, FR, GB, IT, LI, NL, SE				
	CN 1201407	A	19981209	CN 1996-198050	19961028
	CN 1090059	B	20020904		

BR 9611339	A	19990406	BR 1996-11339	19961028
ES 2134016	T3	19990916	ES 1996-937285	19961028
JP 11515021	T	19991221	JP 1997-517063	19961028
JP 3844781	B2	20061115		
US 5981808	A	19991109	US 1997-892831	19970715
NO 9801937	A	19980429	NO 1998-1937	19980429
NO 308894	B1	20001113		
PRAI US 1994-316676	B2	19940930		
US 1995-550589	A	19951031		
US 1996-720270	B1	19960926		
WO 1996-EP4700	W	19961028		

AB 1,3-Propanediol is prepared by: (a) reacting a cobalt salt selected from at least one of cobalt hydroxide, cobalt(II, III) oxide and cobalt carbonate with synthesis gas in a nonwater-miscible liquid to produce a cobalt carbonyl hydroformylation catalyst; (b) hydroformylating ethylene oxide with synthesis gas in a nonwater-miscible liquid medium in the presence of a catalytic amount of the cobalt carbonyl catalyst mixture and a catalyst promoter to produce a product mixture comprising <15% 3-hydroxypropanal; (c) adding an aqueous liquid to the intermediate product mixture and extracting into the aqueous liquid a major portion of the 3-hydroxypropanal so as to provide an aqueous phase comprising 3-hydroxypropanal in greater concentration than the concentration of 3-hydroxypropanal in the intermediate product mixture, and an organic phase comprising a major portion of the cobalt carbonyl; (d) separating the aqueous phase from the organic phase; (e) returning a major portion of the organic phase to step (b); (f) hydrogenating the aqueous phase comprising 3-hydroxypropanal in the presence of a hydrogenation catalyst; and (g) recovering the 1,3-propanediol. A process flow diagram is presented.

L9 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2007 ACS on STN  
 AN 1997:414046 CAPLUS  
 DN 127:36203  
 TI Preparing 1,3-propanediol  
 IN Lam, Khieth Thanh; Powell, Joseph Broun; Weider, Paul Richard  
 PA Shell Internationale Research Maatschappij BV, Neth.; Shell Canada Limited  
 SO PCT Int. Appl., 23 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 FAN.CNT 9

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9716250	A1	19970509	WO 1996-EP4700	19961028
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN				
	RW: KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI				
	US 5684214	A	19971104	US 1995-550589	19951031
	CA 2235065	A1	19970509	CA 1996-2235065	19961028
	CA 2235065	C	20060103		
	AU 9674954	A	19970522	AU 1996-74954	19961028
	AU 700053	B2	19981217		
	EP 862495	A1	19980909	EP 1996-937285	19961028
	EP 862495	B1	19990728		
	R: BE, CH, DE, ES, FR, GB, IT, LI, NL, SE				
	BR 9611339	A	19990406	BR 1996-11339	19961028
	JP 11515021	T	19991221	JP 1997-517063	19961028
	JP 3844781	B2	20061115		
	NO 9801937	A	19980429	NO 1998-1937	19980429



NO 308894 B1 20001113  
PRAI US 1995-550589 A 19951031  
US 1994-316676 B2 19940930  
WO 1996-EP4700 W 19961028

AB 1,3-Propanediol is manufactured by (a) reacting  $\geq 1$  Co hydroxide, Co (II, III) oxide, and Co carbonate with synthesis gas in an essentially non-water-miscible liquid medium under conditions effective to produce a cobalt carbonyl reaction product comprising at least one active cobalt carbonyl hydroformylation catalyst species; (b) contacting ethylene oxide with synthesis gas in an essentially non-water-miscible liquid medium in the presence of catalytic amount of the cobalt carbonyl reaction product mixture and an effective amount of a catalyst promoter under reaction conditions effective to produce an intermediate product mixture comprising  $< 15\%$  3-hydroxypropanal (I); (c) adding an aqueous liquid to said intermediate product mixture and extracting into said aqueous liquid a major portion of the

I so as

to provide an aqueous phase containing I in greater concentration than the concentration of I in

the intermediate product mixture and an organic phase containing a major portion of

the cobalt carbonyl; (d) separating the aqueous phase from the organic phase;

(e)

returning at least a major portion of the organic phase to the process of step (b); and (f) contacting the aqueous phase containing I with H in the

presence

of a hydrogenation catalyst.

L9 ANSWER 6 OF 7 CAPLUS COPYRIGHT 2007 ACS on STN

AN 1996:446512 CAPLUS

DN 125:114171

TI Process and catalysts for preparing 1,3-alkanediols and 3-hydroxyaldehydes by the hydroformylation of epoxides

IN Arhancet, Juan Pedro; Forschner, Thomas Clayton; Powell, Joseph Brown; Semple, Thomas Carl; Slauch, Lynn Henry; Thomason, Terry Blane; Weider, Paul Richard

PA Shell Internationale Research Maatschappij BV, Neth.; Shell Canada Limited

SO PCT Int. Appl., 25 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 2

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 9610550	A1	19960411	WO 1995-EP3868	19950928
W: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM				
RW: KE, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
US 5463145	A	19951031	US 1994-316673	19940930
US 5545765	A	19960813	US 1994-316661	19940930
IN 192184	A1	20040313	IN 1995-DE1730	19950920
CA 2201305	A1	19960411	CA 1995-2201305	19950928
AU 9536993	A	19960426	AU 1995-36993	19950928
AU 689963	B2	19980409		
ZA 9508160	A	19960508	ZA 1995-8160	19950928
EP 783475	A1	19970716	EP 1995-934652	19950928
EP 783475	B1	19981209		
R: AT, BE, CH, DE, DK, ES, FR, GB, IT, LI, NL, PT, SE				
CN 1161685	A	19971008	CN 1995-195315	19950928
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PRAI US 1994-316661	A	19940930		
US 1994-316673	A	19940930		
WO 1995-EP3868	W	19950928		

OS MARPAT 125:114171

AB The title process comprises hydroformylating an oxirane (e.g., ethylene oxide) with CO and H<sub>2</sub> in the presence of Co-based catalyst and a promoter that is a lipophilic quaternary salt of a Group V element [e.g., Bu<sub>3</sub>(PhCH<sub>2</sub>)NOAc] to produce 1,3-alkanediols (e.g., 1,3-propanediol) and 3-hydroxyaldehydes (e.g., 3-hydroxypropanal). A process flow diagram is presented.

L9 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2007 ACS on STN

AN 1995:965003 CAPLUS

DN 124:88122

TI Cobalt-catalyzed process for manufacturing 1,3-propanediol in high yields without the use of a phosphine-ligated cobalt catalyst

IN Powell, Joseph B.; Slaugh, Lynn H.; Forschner, Thomas C.; Thomason, Terry B.; Semple, Thomas C.; Weider, Paul R.; Arhancet, Juan P.

PA Shell Oil Co., USA

SO U.S., 7 pp.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5463144	A	19951031	US 1994-316671	19940930
PRAI	US 1994-316671		19940930		

OS MARPAT 124:88122

AB 1,3-Propanediol is prepared in a process comprising the steps (a) contacting, in an essentially non-water-miscible organic solvent, ethylene oxide with CO and H in the presence of non-phosphine-ligated cobalt compound and an effective amount of a lipophilic quaternary ammonium salt promoter at 50-100° and 500-5000 psig, (b) adding aqueous liquid to intermediate product mixture of (a) comprising <15% 3-hydroxypropanal (I) and extracting into

said aqueous liquid a major portion of the I at <100°, (c) separating the aqueous

phase containing high concentration of I from the organic phase containing catalyst, (d)

contacting the aqueous phase with H in the presence of a hydrogenation catalyst at ≥100 psig and ≥40° to provide a

hydrogenation product mixture comprising 1,3-propanediol, (e)

recovering 1,3-propanediol from the hydrogenation product mixture;

and (f) returning at least a portion of the organic phase comprising cobalt compound and lipophilic quaternary ammonium salt to the process of step (a).

Thus, 0.46 g of 40% benzyltrimethylammonium methoxide promoter in MeOH, was added in the hydroformylation reaction and 4.73% I was formed at a rate of 11.8 h<sup>-1</sup>, or a 2.6-fold rate increase over that observed in the absence of promoter.